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Grampian AB12 4BX (GB). **TRAHAN, Kevin, Otto**; 25  
Tamarind Place, Spring, Houston, TX 77381 (US).

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(74) Agent: **HARDING, Richard, Patrick**; Marks & Clark,  
4220 Nash Court, Oxford Business Park South, Oxford,  
OX4 2RU (GB).

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(71) Applicant: **WEATHERFORD/LAMB, INC.** [US/US];  
515 Post Oak Boulevard, Suite 600, Houston, TX 77027  
(US).

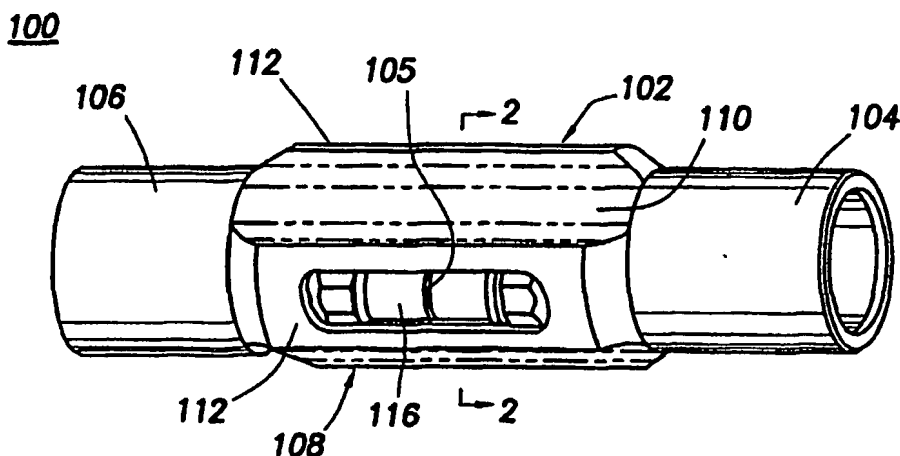
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(71) Applicant (*for IS only*): **HARDING, Richard, Patrick**  
[GB/GB]; Marks & Clerk, 4220 Nash Court, Oxford Busi-  
ness Park South, Oxford OX4 2RU (GB).

(72) Inventors: **SIMPSON, Neil, Andrew, Abercrombie**;  
Burn of Daff Farm, Downies, Portlethen, Aberdeen,

[Continued on next page]

(54) Title: APPARATUS AND METHODS FOR SEPARATING AND JOINING TUBULARS IN A WELLBORE



(57) Abstract: The present invention provides methods and apparatus for cutting tubulars in a wellbore. In one aspect of the invention, a cutting tool having radially disposed rolling element cutter is provided for insertion into a wellbore to a predetermined depth where a tubular therearound will be cut into an upper and lower portion. The cutting tool is constructed and arranged to be rotated while the actuated cutters exert a force on the inside wall of the tubular, thereby severing the tubular therearound. In one aspect, the apparatus is run into the well on wireline which is capable of bearing the weight of the apparatus while supplying a source of electrical power to at least one downhole motor which operates at least one hydraulic pump. The hydraulic pump operates a slip assembly to fix the downhole apparatus within the wellbore prior to operation of the cutting tool. Thereafter, the pump operates a downhole motor to rotate the cutting tool while the cutters are actuated.

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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7   E21B29/00   E21B43/10   E21B33/04   E21B33/14   E21B17/00				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7   E21B   B23D   B26D				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, PAJ, WPI Data				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	US 1 739 932 A (ERCOLE VENTRESCA) 17 December 1929 (1929-12-17)	1,2		
Y	page 1, line 91 - page 2, line 40; figures	5,6		
X	US 1 952 652 A (BRANNON ROBERT D) 27 March 1934 (1934-03-27)	1-4,7		
Y	page 1, line 58 - line 78; figures page 2, line 35 - line 93	5,6,8,9		
Y	WO 00 37766 A (ASTEC DEV LTD ; SIMPSON NEIL ANDREW ABERCROMBI (GB)) 29 June 2000 (2000-06-29) page 29, line 9 - line 26; figures abstract	8,9		
X	US 2 695 449 A (CHAUVIN WILLIE L) 30 November 1954 (1954-11-30) claim 1; figures	1-4		
-/-				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <span style="margin-left: 100px;"><input checked="" type="checkbox"/> Patent family members are listed in annex.</span>				
* Special categories of cited documents :				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;">           "A" document defining the general state of the art which is not considered to be of particular relevance            "E" earlier document but published on or after the international filing date            "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)            "O" document referring to an oral disclosure, use, exhibition or other means            "P" document published prior to the international filing date but later than the priority date claimed         </td> <td style="width: 50%; vertical-align: top; padding: 5px;">           "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention            "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone            "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.            "Z" document member of the same patent family         </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "Z" document member of the same patent family
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Authorized officer  <div style="text-align: center; font-weight: bold;">Weiland, T</div>			

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 01/04950

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 1 358 818 A (ELLIS BERING ROBERT) 16 November 1920 (1920-11-16)	1,2
A	page 1, line 64 - line 75; figures page 1, line 98 - line 102 page 3, line 1 - line 45	10
A	US 4 389 765 A (THOMPSON JR FLOYD M) 28 June 1983 (1983-06-28) column 2, line 12 - line 20; figures column 2, line 47 - column 3, line 54	10
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A	US 3 498 376 A (SCHWEGMAN HARRY E ET AL) 3 March 1970 (1970-03-03) abstract; figures	13-16
A	SU 976 019 A (VNII KREPLENIYU SKVAZHIN BUROV) 23 November 1982 (1982-11-23) figures	13
A	US 5 787 984 A (MABILE CLAUDE) 4 August 1998 (1998-08-04) column 3, line 64 - column 4, line 16; figures	13
E	WO 01 83943 A (SCHLUMBERGER HOLDINGS LTD SHL;SCHLUMBERGER SERVICES LTD SSL; NICHOLSON) 8 November 2001 (2001-11-08) abstract; figures	17-20
E	US 6 354 373 B1 (SOREM ROBERT M ET AL) 12 March 2002 (2002-03-12) abstract; figures	17
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P,A	WO 01 60545 A (STEWART BRUCE R ;COOK ROBERT LANCE (US); HAUT RICHARD CARL (US); B) 23 August 2001 (2001-08-23) page 10, line 20 - page 11, line 10; figures	18,24
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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB 01/04950

## Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

**1. Claims: 1-12**

**Apparatus for cutting a tubular**

**1.1. Claims: 10-12**

**Selfcontained cutting apparatus**

**2. Claims: 13-16**

**Apparatus and method for setting a liner**

**3. Claims: 17-22**

**A tubular with differing wall thickness**

**4. Claims: 23-25**

**A tubular section with an aperture and cementing method**

Please note that all inventions mentioned under item 1, although not necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

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Information on patent family members

International Application No

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